REMARKS

This amendment is responsive to the outstanding Office Action dated April 27, 2005. Claims 1 - 90 are pending in the application. Claims 1 - 18, 34 - 48, and 58 - 79 are withdrawn from consideration. Claims 19 - 33, 49 - 57 and 80 - 90 are rejected. Reexamination is respectfully requested in view of the foregoing amendments and following remarks.

As to Claim Rejections - 35 USC § 112

In the following, discussion of Figures 1, 2 etc. relate to claims 19, 21; discussion of Figures 14, 15 etc. relate to claim 22; discussion of Figures 24, 25 etc. relate to claim 49; and discussion of Figures 31, 32 etc. relate to claim 80.

At page 5, line 3 up from the bottom, the Examiner states that the substrate-bonding conductive oxide layer recited in claims 19, 21, 22, 49, and 80 is unclear:

The substrate-bonding conductive oxide layer in claims 19, and 21 is described as follows: "forming the substrate-bonding conductive oxide layer on the bonding surface side of the light-emitting portion and/or the transparent conductive semiconductor substrate". From the recitation of the claims, it is obvious

that the substrate-bonding conductive oxide layer means the ITO 10 interposed between the light-emitting layer portion 24 and the p-Gap 8 as the transparent conductive semiconductor substrate (see claims 19 and 21, lines 1 - 6). Further, it is also described in the specification that "The p-GaP single crystal substrate 8 is bonded to the main surface MP4 of the light-emitting layer portion 24 while placing an ITO layer 10 in between" (see page 87, line 5).

Claims 22, 49, and 80 have no recitation of the substrate-bonding conductive oxide layer. However, in claim 19, the ITO 10 as a bonding-use transparent conductive oxide layer which is interposed between the Si substrate 7 and the light-emitting layer 24.

The Examiner has suggested referring to layers as "first" and "second". Applicant respectfully submits that in claims 19 and 21, and all other claims that the only possible antecedent for "the substrate bonding conductive oxide layer" is found in the first 6 lines of the claims, and that in the 6 lines the placement is between substrate (8) (line 2) and layer portion (24) (line 3). There is no ambiguity as to the fact that ITO 10 is referred to.

At page 4, beginning at line 3, the Examiner states that that the "contact layer" or the "metal layer" recited in claims 19, 21, 22, 49, and 80 are unclear:

The contact layer is made of InGaAs or the like (page 87,

line 9). Therefore, the contact layer is different from the metal layer.

The contact layer in claim 19 is "a contact layer for reducing junction resistance in the substrate-bonding conductive oxide layer between the light-emitting layer and the substrate-bonding conductive oxide layer". That is, it is clear from the recitation of the claims that the contact layer means the contact layer 30 located between the light-emitting layer portion 24 and the ITO 10 shown in Fig. 1.

In claim 19, there is only one contact layer in the entire claim, which is initially recited in line 7. After line 7, the recitations in lines 17, 18 and 28 all refer back to "the" contact layer of line 7.

Claim 21 has no recitation of the contact layer or metal layer.

The contact layer in claim 22 is "formed on the separation-side main surface", "for reducing junction resistance of the transparent conductive oxide layer prior to the transparent conductive oxide layer forming step". It is obvious from the recitation of the claim that the contact layer means the contact layer 30 formed between the light-emitting layer 24 and the ITO layer 20 shown in Fig. 15.

In claim 22, the last 5 lines of the method recite "a contact layer forming step" and then state the step is for becoming a contact layer. There is no double use of "a contact"

because one is forming and the other is the actual contact.

The contact layer of claim 54 which is dependent on claim 49 is "formed on the first main surface side of the light-emitting layer portion", "for reducing junction resistance of the bonding-use transparent conductive oxide layer prior to the bonding-use transparent conductive oxide layer forming step". It is obvious from the recitation of the claim that the contact layer means the contact layer 30 formed between the ITO 10 and the light-emitting layer 24 shown in Figs. 24, 25.

In claim 54, there is recited a contact layer forming step for forming a contact layer. The step and the formed layer are for the same layer as claimed.

In claim 49, the metal layer forming step for forming a metal layer clearly refers to the same layer as claimed.

Claim 80 includes a structure in which the light-emitting layer portion 24 is bonded to the first main surface of the Si substrate via the main metal layer 70. This structure allows the formation of the reflective surface by means of the main metal layer 70.

In claim 80, "a metal layer" is initially recited in line 6. Afterwards, all references are to "the" metal layer. This is proper antecedent terminology in the claim. There is one metal layer and no ambiguity as claimed.

At page 4, line 7, the Examiner states that the light-emitting-layer growing substrate and the conductive substrate

recited in claims 19, 21, 22, 49, and 80 are unclear.

The light-emitting-layer growing substrate means, for example, as shown in Fig. 2, a GaAs single crystal substrate, and on its first main surface, a light-emitting layer portion made of compound semiconductor is epitaxially grown. That is, since the light-emitting-layer growing substrate is used for epitaxially growing of the light-emitting layer, the light-emitting-layer growing substrate is required to have a lattice constant coinciding with that of the light-emitting layer as much as possible.

On the other hand, the transparent conductive semiconductor substrate is formed of semiconductor transparent to the light emitted from the light-emitting layer. For example, the transparent conductive semiconductor substrate means the p-GaP8 shown in Fig. 1. The transparent conductive semiconductor substrate is used as a current diffusing layer, for example. When a substrate which exhibits large light absorption such as GaAs is used as a light-emitting-layer growing substrate, bonding a transparent conductive substrate such as GaP thereto can enhance the effect of extracting light from the side surface of the device via said substrate and the current diffusion effect. In other words, the transparent conductive semiconductor substrate needs to be transparent to the light emitted from the light-emitting layer, and specifically, has to be a semiconductor having a band gap wider than the light-emitting layer. Many of

transparent conductive semiconductor substrates have lattice constants narrower than that of the light-emitting layer, and are not adequate as a growing substrate. As a specific example, for an AlGaInP light-emitting layer, the growing substrate is GaAs, and the transparent conductive substrate is GaP. GaP has a lattice constant smaller than that of GaAs. Therefore, the light-emitting layer growing substrate and the transparent conductive substrate have different light transmittances from each other.

As to claim 19, it is believed that the Examiner, when referring to "conductive substrate", refers to "a substrate-bonding conductive oxide layer composed of a conductive oxide" at lines 5 to 7 of claim 19. This element is initially recited, such as at lines 21, 11 and 7. The claim has proper antecedent basis and is clear.

In claim 19, "the" has been changed to "a" at line 30 to initially recite "light-emitting layer growing substrate".

As to claim 21, the "conductive semiconductor substrate" of line 2 is believed to be referred to. In all instances, the subsequent use of this term refers back to line 2. There is no ambiguity.

In claim 21, line 21, "the" has been changed to "a" to initially recite "light-emitting-layer-growing substrate".

In claim 22, there is proper antecedent basis for "light-emitting-layer-growing substrate". There is no recitation of

"conductive substrate".

In claim 49 light-emitting-layer-growing substrate is recited once. The first recitation of "conductive substrate" has been changed to "a" for initial recitation. This provides antecedent basis for the second occurrence.

In claim 80, the terms "light-emitting-layer-growing substrate" and "conductive substrate" are absent.
In claim 88, Applicant has positively recited the limitation by eliminating "assumed".

Although claim 80 is stated as being unclear, claim 80 is clear for the above-described reason. Further, in claim 80, a device substrate, a main metal layer, and an ITO layer which is diffusion-blocking layer are arranged in this order, so that "when the device substrate and the compound semiconductor layer are bonded to each other via the main metal layer, the component diffusion from the device substrate toward the main metal layer is blocked by the diffusion-blocking layer, and in turn, the quality deterioration in the main metal layer caused by the reaction with the device substrate component can be effectively suppressed". Then, "problems such as the reduction in the reflectance on the reflective surface formed by the main metal layer and the reduction in the tight contact strength between the main metal layer and the compound semiconductor layer can be effectively suppressed; in addition, the reduction in the product yield of the light-emitting device caused by these problems is

difficult". Consequently, according to the method recited in claim 80, a diffusion blocking function is added, and the problem that components diffuse from the substrate device due to the thermal treatment can be effectively suppressed.

Claim Rejection - 35 USC § 102

(1) As to claim 19:

Essential requirements of claim 19 are "comprises a light-emitting layer portion composed of a compound semiconductor and bonded on one main surface of the transparent conductive semiconductor substrate while placing substrate-bonding oxide layer composed of a conductive oxide in between " and "a substrate bonding conductive oxide layer forming step for forming the substrate-bonding conductive oxide layer on the bonding surface side of the light-emitting layer portion and/or the transparent conductive semiconductor substrate".

In Furukawa et al., there exists no substrate-bonding conductive oxide layer for bonding the transparent conductive semiconductor substrate and the light-emitting layer portion. Therefore, the invention of claim 19 is not anticipated by Furukawa et al.

(2) As to claim 22:

An essential requirement of claim 22 is "a contact layer

forming step for forming a layer intended for becoming a contact layer for reducing junction resistance of the transparent conductive oxide layer on the separation-side main surface prior to the transparent conductive oxide layer forming step". The contact layer is formed on the separation-side main surface and serves to reduce the junction resistance of the transparent conductive oxide layer.

Contrary to this, in Furukawa et al., there exists no contact layer formed on the separation-side main surface for reducing junction resistance of the transparent conductive oxide layer. The contact layer 61 is formed on the n-type transparent substrate (second substrate 60). Further, in Furukawa et al., it is an essential requirement to sandwich the light-emitting layer portion between the transparent substrates from its sides.

Consequently, the invention recited in claim 22 is different from Furukawa et al.

(3) As to claim 49:

An essential requirement in claim 49 is "a bonding-use transparent conductive oxide layer forming step for forming a bonding-use transparent conductive oxide layer on the first main surface side of the light-emitting layer portion".

However, in Furukawa et al., there exists no substrate bonding-use conductive oxide layer for bonding the transparent conductive semiconductor substrate to the light-emitting layer

portion.

Further, an essential requirement of claim 49 is "a metal layer forming step for forming a metal layer on a first main surface side of the conductive substrate". By forming the Au layer 40 as the metal layer on the first main surface side of the Si substrate 7 as the conductive substrate, an excellent metallic luster after the bonding can be maintained and high reflectance can be achieved.

Contrary to this, in Furukawa et al., there exists no metal layer for enhancing light extracting efficiency. No basis of enhancing the light extracting efficiency can be found in the contact layer 61.

Consequently, the invention of claim 49 is different from that of Furukawa et al.

Claims 20, 21, 27 - 29, 31, 32 and 80 - 90

These claims have not been examined and rejected over prior art in light of § 112 rejections. The Examiner cites In re Steele, 134 USPQ 292 (CCPA 1962) at page 8 of the Office Action. The Examiner's decision not to examine the above claims on the basis of prior art is respectfully traversed.

MPEP § 2143.03 states that indefinite limitations must be considered, and that a claim limitation which is considered indefinite cannot be disregarded. The MPEP in support for this proposition relies upon Ex parte Ionescu, 222 USPQ 537 (Bd. Pat.

App. and Inter. 1984).

As can be easily seen by the amendments in the claims, only several minor amendments were made to correct for antecedent basis. In many cases, as explained in the remarks directed to specific claims, the Examiner did not note that the claims recite only a single element, and then merely refer back to it. An example of this is found with respect to claims 19, 21, 22, 49, and 80 at page 4 where the Examiner asserts that there is more than one contact (i.e., 3 contact layers). This is simply not the case as explained with respect to claim 19 and also claim 21.

With respect to claim 20, Applicant has only removed the words "intended" and changed the spelling of indium. Claim 20 depends from claim 19, which was examined. Clearly claim 20 should have been examined.

Claim 21 has been amended only to change the word "the" to "a" in the last line. This is a mere antecedent issue and claim should have been examined.

Claim 27 which depends from claim 24 has not been amended at all and should have been examined.

Claims 28 and 29 also should have been examined for the same reasons as claim 27.

Claim 31 depends from claim 22, which was examined. Claim 31 has not been amended at all while claim 22 was amended on the merits.

Claim 32 depends from claim 31 and has not been amended. It

should have been examined.

Claims 80 - 87 were not examined on the basis of prior art. There is no amendment in these claims because as explained above, these claims are not indefinite.

Claim 87 has been amended only to remove indefinite language such as replacing "being assumed" with "is" and deletion of the word "intended". Clearly, this claim should have been examined on the merits as explained above with respect to the discussion of the claim both as a technical matter, and as to its meaning as normal claim construction under 35 USC § 112.

The Examiner has not in this rejection made out an case to show that speculation about the meaning of the terms or assumptions must be made as to the scope of the claims in order to examine them.

However, as can clearly be seen by reference to MPEP § 2143.03, that earlier decision of In re Steele, (1962) is clearly overruled by the Patent Office decision wherein the Board in 1984 requires examiners to examine the claims, see Ex parte Ionesco, supra.

If it is found that rejection of any one of claims 20, 21, 27 - 29, 31, 32 and 80 - 90 was made improperly without examination on the basis of prior art, the next Office Action cannot be made final.

In view of the foregoing, it is respectfully submitted that

the application is now in condition for allowance, and early action in accordance thereof is requested. In the event there is any reason why the application cannot be allowed in this current condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully submitted,

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